

Amendments to the Specification

The paragraph starting at page 1, line 13 and ending at line 21 has been amended as follows.

A recording apparatus having functions of a printer, a copying machine, a facsimile machine, etc., or a recording apparatus used for an output ~~terminals~~ terminal of a complex-type electronic apparatus ~~and or~~ or a workstation having computers and word processors therein is constructed so as to record an image on a recording member (recording medium) such as a paper sheet ~~and or~~ or a plastic sheet on the basis of image information. Such a recording apparatus may be classified into types of ink-jet, wire-dot-matrix, thermal, laser beam, and so forth.

The paragraph starting at page 2, line 21 and ending at page 3, line 19 has been amended as follows.

~~In~~ For that purpose, in ink-jet recording apparatuses for ink-jet recording on recording ~~material~~ materials with various thicknesses such as plain paper and postcards, in order to maintain a predetermined gap between the recording head and the recording surface of the recording material, there are provided a system in which the recording head is displaced in any one of directions approaching and separating from the recording material and a system in which the recording material is displaced in any one of directions approaching and separating from the recording head. In any one of the systems adopted,

the gap (referred to as the "head gap" below) between an ink-ejection face of a recording head and a base position, which is the back surface of the recording material opposite to the recording surface adopted as a base point (or a position for supporting the recording material of a platen adopted as a base point), is adjusted so as to correspond to recording material with various thicknesses. For example, in an ink-jet recording apparatus in which the back surface of the recording material is supported by the platen, the gap between the platen and the recording head (that is, the gap between the recording head and the platen position for supporting the back surface of the recording material, which is to be the head gap) is adjusted so as to correspond to the thickness of the recording material.

The paragraph starting at page 4, line 2 and ending at line 10 has been amended as follows.

When forming images on a plain paper sheet by ejecting ink drops with high density, the surface of a recording material is liable to deform so as to curl to have roughness thereon due to paper swelling, so that the recording material and the recording head may rub against each other. In such a case, even when the recording material is plain paper equivalent to ~~thin-paper~~ thin paper, the head gap position for thick paper (thick-paper position) may be set and a user may freely switch the head gap position according to situations.

The paragraph starting at page 4, line 11 and ending at line 16 has been amended as follows.

~~As is described in~~ In the conventional example described above, however, although a user can freely switch the head gap position, even when better images could be ~~originally obtained rather at~~ by using a smaller head gap, the user may leave the head gap at the thick-paper position, so that images with inferior quality may be consequently output.

The paragraph starting at page 4, line 17 and ending at line 23 has been amended as follows.

In particular, when forming images by ejecting ink at both ~~proceeding forward~~ and ~~retracting strokes~~ reverse scans during ~~reciprocating~~ reciprocation of a carriage, when a position other than the optimum position is selected, the positions of ink drops depositing on the recording material ~~at in the proceeding stroke~~ forward scan may deviate from those ~~at in the retracting stroke~~ reverse scan, so that excellent images may not be obtained.

The paragraph starting at page 4, line 24 and ending at page 5, line 3 has been amended as follows.

When the larger head gap is preferable in such cases as for envelopes and postcards, if a user performs recording by leaving the head gap at the thin-paper position, the recording head ~~comes~~ may come into contact with the recording material, which may result in having ~~stained~~ recorded images stained with ink.

The paragraph starting at page 8, line 15 and ending at page 9, line 13 has been amended as follows.

In Figs. 1 to 3, the paper feeding section 2 comprises a base 20 to which a pressure plate 21 for stacking recording sheets P as recording media and a feeding roller 22 for feeding the recording sheets P are attached. In the pressure plate 21, a slidable side guide 23 is movably provided for restricting the stacking position of the recording sheets P. The pressure plate 21 is rotatable about a shaft connected to the base 20 and is urged to the feeding roller 22 by a pressure-plate spring 24. The part of the pressure plate 21 opposing the feeding roller 22 is provided with a separating pad 25 made from a material with a high coefficient of friction such as synthetic leather for preventing piled-up feeding of the recording sheets P. Furthermore, the base 20 is provided with a separating claw 26 for separating the recording sheets P into every one sheet by covering a corner in one direction of a cut recording sheet ~~p~~ P, a bank 27 integrally formed with the base 20 for separating recording sheets that cannot use the separating claw 26, such as thick-paper sheets, a switching lever 28 for switching the separating claw 26 ~~from not allowing to operate~~ between operating at the plain paper position (thin-paper position) ~~to allowing to operate~~

and operating at the thick-paper position, and a release cam 29 for releasing the abutment between the pressure plate 21 and the feeding roller 22.

The paragraph starting at page 13, line 20 and ending at line 25 has been amended as follows.

By the structure described above, the recording sheet P having images formed thereon at a position in which the carriage section 5 opposes the platen 34 is conveyed by the nip between the discharge roller 41 and the spur 42 ~~pinched therebetween~~ so as to be discharged into a discharge tray (not shown).

The paragraph starting at page 16, line 16 and ending at page 17, line 23 has been amended as follows.

As described above, the projection 586(a) and the two grooves 586(b) are head-gap adjusting mechanisms which respectively correspond to a thin recording medium, such as so-called plain paper, and a recording medium with a thickness larger than a predetermined value, such as a postcard ~~and~~ or an envelope. In the embodiment, two values are set, that is, the gap between the recording head and the platen is set to 1.0 mm according to the head gap at the thin-paper position while it is set to 2.0 mm corresponding to the thick-paper position. When setting such values, at the thin-paper position, the distance between the recording surface of the recording sheet (0.1 to 0.2 mm thicknesses

are supposed approximately) and the recording head may be 0.8 to 0.9 mm approximately. At the thick-paper position, although the distance between the recording sheet and the recording head is largely changed according to the kind of the recording sheet, it may be 1.8 to 1.6 mm approximately in the case of the postcard (0.2 to 0.4 mm thicknesses are supposed approximately). The reason of such setting is that the recording surface of the thin sheet has small roughness of the recording surface and can excellently follow a platen supporting-face for supporting the back-face of the sheet and is difficult to rise therefrom, while the ~~thick-recording~~ thick recording sheet such as a postcard has roughness on the top surface larger than the thin paper and is liable to rise from the platen due to the rigidity of the recording sheet itself. That is, the reason is that in the ~~thick-recording~~ thick recording sheet with thickness larger than that of the ~~thin-recording~~ thin recording sheet, the distance between the recording surface and the recording head is set rather larger for allowing a margin. Therefore, it is preferable to make adjustment of the ink-ejection timing, which will be described later, in order to obtain recorded images with higher quality.

The paragraph starting at page 20, line 10 and ending at line 22 has been amended as follows.

If the timing of ink drops impacting the recording surface when forward recording (when the carriage moves from the left to the right viewed in Fig. 2) is a standard, when the impact timing in the backward recording at the thin-paper position is

equalized to that at the thick-paper position, the forward recording is deviated from the backward recording. The amount of the deviation on calculation is:

$$(\Delta d/V_d) \times V_c \text{ [mm]},$$

wherein the ink ~~injecting~~ ejecting speed is V_d [mm/s], the scanning speed of the carriage is V_c [mm/s], and the distance difference between the recording surface and the recording head at each position is Δd [mm].

The paragraph starting at page 20, line 23 and ending at page 21, line 15 has been amended as follows.

In the embodiment, for example,

when $V_d = 10000$ [mm/s] and

$$V_c = 1000 \text{ [mm/s]},$$

because Δd is 1.0 [mm] approximately when it is large, as described above, an ink deposit positional shift of approximately 0.1 mm is produced. Even when an operator records at the thick-paper position by mistake on a recording sheet to be recorded at the thin-paper position, the deposit positional shift is 0.1 mm because Δd is still 1.0 [mm]. Such a value corresponds to approximately 2.5 ~~dot~~ dots in terms of 600dpi, so that deterioration in image quality is clearly recognized when viewing images. Accordingly, when the head gap is at the thick-paper position, it is required for obtaining recorded images with high quality to correct this deposit positional shift during the backward

scanning. Specifically, in the embodiment, ejection timing is controlled to advance by $0.1/1000 = 0.0001$ [sec] (0.1 msec) when the deposit positional shift is 0.1 mm.

The paragraph starting at page 21, line 24 and ending at page 22, line 3 has been amended as follows.

In the first embodiment, the adjusting lever 581 is mounted on the carriage 5, so that it is required for operating the adjusting lever 581 to perform an opening and closing operation of an outer cover (not shown) arranged to cover the movement range of the carriage.

The paragraph starting at page 22, line 10 and ending at line 20 has been amended as follows.

In the ink-jet recording apparatus, when replacing the head cartridge 7 mounted on the carriage 5, the carriage 5 is moved from the armored (or covered) home position of the carriage to an opening (covered by the openable and closeable outer cover mentioned above) ~~openably and closeably~~ formed at the substantially center position of the scanning range of the carriage so as to offer the convenience in the replacement of the head cartridge 7. The movement of the carriage is performed based on the detection of the opened state of the above-mentioned outer cover arranged at the substantially center position of the scanning range of the carriage.

The paragraph starting at page 24, line 22 and ending at page 25, line 4 has been amended as follows.

In the first embodiment, the carriage 5 is abutted to the right side of the chassis 8 so as to detect the fiducial or reference position during initialization of the printer, and the restricting portion 8(a) for abutting the boss 581(b) of the adjusting lever 581 is arranged ~~in~~ at the left side of the chassis 8. The carriage 5 therefore has to be moved from the right end to the left end of the scanning range of the carriage in order to detect the head-gap state.